

Citation:

Fiorito LM, Ventura AK, Mitchell DC, Smiciklas-Wright H, Birch LL. Girls' dairy intake, energy intake, and weight status. J Am Diet Assoc. 2006 ;106(11):1851-5.

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Study Design:

Cross-sectional study

Class:

D - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:



POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To explore the relationships among girls' weight status, dairy servings, and total energy intake.

Inclusion Criteria:

- Girls living with two biological parents, the absence of severe food allergies or chronic medical problems affecting food intake, and the absence of dietary restrictions involving animal products.
- Families with age-eligible female children within a five-county radius received mailings and follow-up telephone calls.

Exclusion Criteria:

- no dietary intake data
- extremely overweight
- extremely high dairy intakes.
- Five girls were excluded during the analysis based on the above criteria and that may have affected the statistical relationship between dairy intake and weight status.

Description of Study Protocol:

Recruitment

- 11 year old non hispanic whites were recruited. A total of 172 participants included in the study.
- Total sample (n=172), plausible (n=86), under- (n=58), and overreporters (n=28).

Design

- Participants included 172 11-year-old non-Hispanic white girls, assessed cross-sectionally. Intakes of dairy, calcium, and energy were measured using three 24-hour recalls.
- Body mass index and body fat measures from dual-energy x-ray absorptiometry were obtained. Because preliminary analyses suggested systematic underreporting of energy intake, the relationships among dairy servings and measures of weight status were examined for the total sample and for subsamples of under-, plausible, and overreporters.

Blinding used (if applicable)

NA

Intervention (if applicable)

Dairy intake.

Statistical Analysis

- Preliminary Pearson correlations were conducted to assess the relation between energy intake and weight status. Girls were categorized as either meeting or not meeting current dairy recommendations at age 11 years.
- Analysis of variance was used to assess differences between girls who met or consumed less than the recommended three servings of dairy.
- χ^2 analyses were used to examine the association between reporting plausibility and weight status.
- Significance for relationships was determined at a level of $P \leq 0.05$; trends were noted at a significance level of $P \leq 0.10$.

Data Collection Summary:

Timing of Measurements

three 24-hour recalls within a 2- to 3-week period, including 2 weekdays and 1 weekend day.

Dependent Variables

Weight status

Energy intake (kcal)

BMI percentile

BMI z score

Body fat (%)

Independent Variables

Dairy intake <3 (servings/d)

Dairy intake ≥ 3 (servings/d)

Control Variables

Dairy intake , body weight status and body fat

Description of Actual Data Sample:

Initial N: 177

Attrition (final N): 172 [Dairy intake <3 (servings/d) (n=104); Dairy intake ≥ 3 (servings/d) (n=68)]

Age: 11-year-old girls

Ethnicity: Non hispanic whites

Other relevant demographics: Dietary intakes

Anthropometrics : Height, weight and BMI ($20.0 \pm 3.9 \text{ kg/m}^2$), body composition

Location: central Pennsylvania

Summary of Results:

- Half of the sample was classified as plausible reporters, while 34% and 16% were classified as under- and overreporters, respectively. In the total sample, the lowest percent reported energy intake/predicted energy requirement was 38%; the highest was 184%.
- The mean percent reported energy intake/predicted energy requirement for underreporters was 71%, indicating that underreporters' reported energy intakes were, on average, about 30% below their predicted energy requirements.
- Mean percent reported energy intake/predicted energy requirement for plausible and overreporters was 99% and 136%, respectively.
- Thirty percent of girls were classified as overweight and 14% were classified as obese.
- A significant negative correlation between reported energy intake and weight status was noted for the total sample ($r=-0.16$, $P<0.05$), suggesting the possibility of substantial underreporting bias, especially by girls with higher weight status.
- Results show that reporting classification and weight status were significantly related ($\chi^2=10.0$, $P<0.01$). Underreporters were significantly heavier than plausible ($P<0.001$) and overreporters ($P<0.001$). In fact, 45% of underreporters were classified as overweight; only 22% of plausible and 14% of overreporters were classified as overweight.
- 104 (60.5%) girls reported consuming less than the recommended three servings of dairy per day, whereas only 68 (39.5%) girls met or exceeded the current recommendations.
- Girls who met the recommended three servings of dairy per day reported significantly higher energy intake and had significantly lower weight status and percentage of body fat.
- In contrast, among plausible reporters (n=86), girls who reported ≥ 3 servings of dairy reported similar mean energy intakes to girls who consumed <3 servings, and girls meeting the recommendation did not differ significantly from those who did not meet the recommendation in either BMI z scores, BMI percentiles, or percentage of body fat.
- This pattern is not consistent with ≥ 3 servings of dairy having a protective effect on body weight. Among underreporters (n=58), girls who reported ≥ 3 servings of dairy had slightly but not significantly higher reported energy intakes, and slightly but not significantly higher percentage of body fat, a pattern that does not support dairy having a protective effect on body weight.
- Thirty-nine percent of girls reported consuming the recommended ≥ 3 servings of dairy per day; these girls also reported higher energy intake but had lower body mass index z scores and body fat than the girls who consumed fewer than three dairy servings each day. Among plausible reporters, no relationship between dairy intake and weight status was noted. This discrepancy may be attributable to a high percentage (45%) of overweight underreporters in the total sample.

Author Conclusion:

- This study suggests techniques to screen for under-, plausible, and overreporters can be used with smaller samples and do not have to involve exclusion of implausible reporters.
- The sample is homogeneous (girls were non-Hispanic white) and the findings cannot be generalized to other racial or ethnic populations or to boys.
- The cross-sectional nature of the study does not allow for the detection of any cause-and-effect relationship in the association observed.
- It is possible that some girls have been misclassified with respect to reporting status because we did not use doubly labeled water technique to assess reporting bias.
- The findings reveal that reporting bias, resulting from the presence of a substantial proportion of underreporters of higher weight status, can contribute to obtaining spurious associations between dairy intake and weight status.
- These findings underscore the need for randomly controlled trials to assess the role of dairy in weight management.

Reviewer Comments:

- This is a cross sectional study and the data is based on only dietary intakes of energy, calcium and dairy intake and body fat and BMI measures.
- The data results are based on only 24 hour recall for 3 days diet record. A one time reading influencing the weight status is questionable. The duration of the study is very important for the cross sectional studies with an appropriate primary and secondary outcomes and confounding factors influencing the weight management.
- Further long term double blind randomized clinical trials are required to study the effect of dairy on weight management. Quantitative assessments are required to study on weight management.
- More information on demographic details, family and medical history and nutrient information includes total fat and quality of fat, other macro and micro nutrient information is also required.
- Excluding subjects during the statistical analysis is not recommended.

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	Yes
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	Yes

Validity Questions

1.	Was the research question clearly stated?	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	Was the selection of study subjects/patients free from bias?	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	Yes
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes

3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	Yes
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	N/A
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	No
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening/factors described?	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	Yes

6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	Yes
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	No
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes

9.2.	Are biases and study limitations identified and discussed?	Yes
10.	Is bias due to study's funding or sponsorship unlikely?	???
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	???

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